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INTEGRATED \*LOW\*-K\* DIELECTRIC AND ETCHING STOP LAYER

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#### ABSTRACT

PROBLEM TO BE SOLVED: To provide a method for depositing and etching a dielectric layer, where a dielectric constant is low and etching speed changes 3:1, for forming horizontal mutual interconnects.

SOLUTION: Quantity of carbon or hydrogen in a dielectric layer fluctuates due to the \*change\* in \*deposition\* condition for installing an etching stop layer or a \*low\* \*k\* dielectric in the application of damascene, which can be substituted for the former dielectric layer. Dual-damascene structure having a dielectric layer whose dielectric constant is not less than '2', which is lower than about 4, can execute deposition in the single reactor and is etched so that vertical or horizontal interconnects by making the concentration of carbon; oxygen gas such as carbon monoxide fluctuate. Etching gas for forming the vertical mutual interconnections comprises CO and a fluorocarbon, and CO gas is preferably removed from etching gas for forming the horizontal interconnects.

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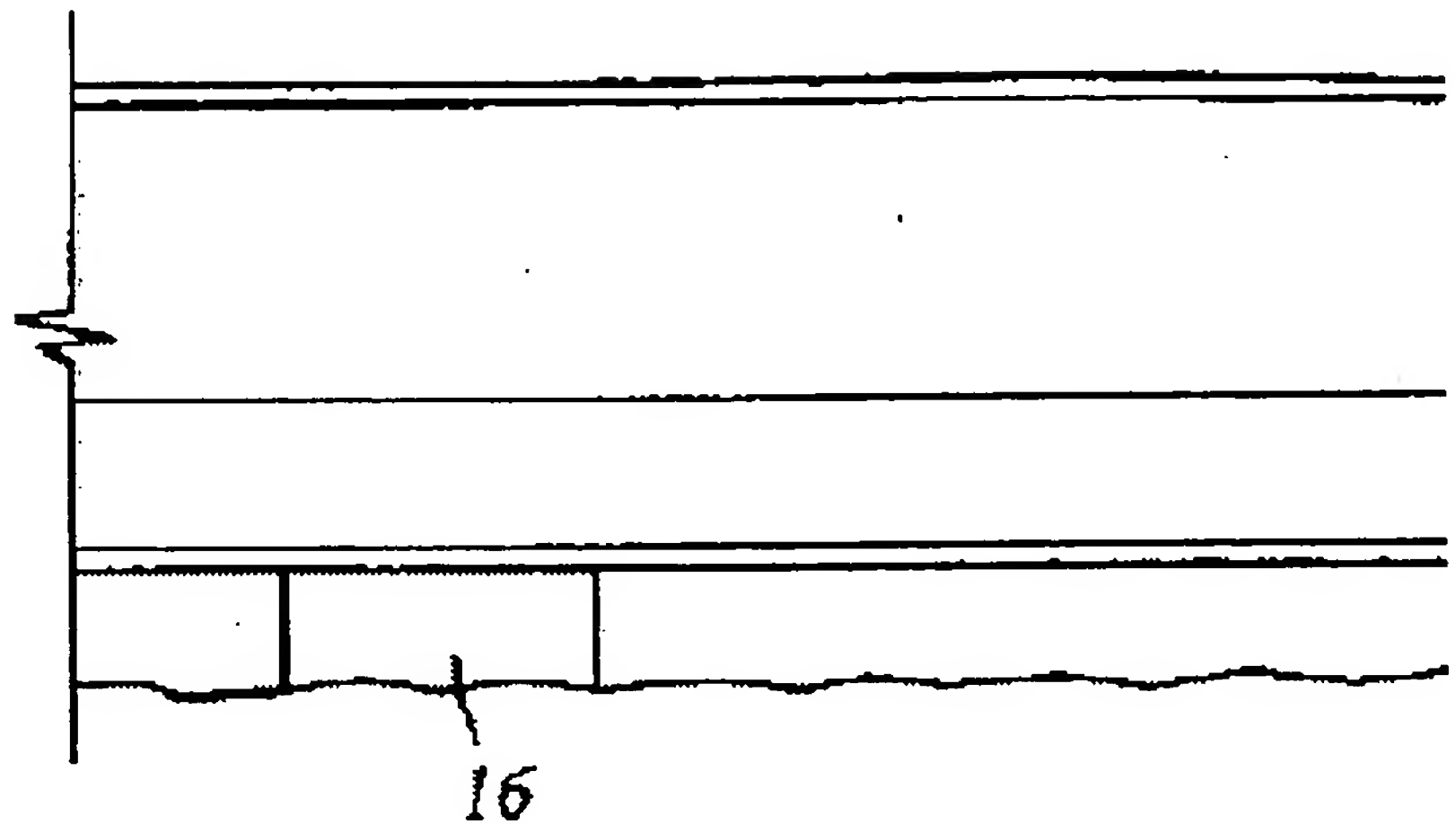
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## (54) INTEGRATED LOW-K DIELECTRIC AND ETCHING STOP LAYER

(57) Abstract:

**PROBLEM TO BE SOLVED:** To provide a method for depositing and etching a dielectric layer, where a dielectric constant is low and etching speed changes 3:1, for forming horizontal mutual interconnects.

**SOLUTION:** Quantity of carbon or hydrogen in a dielectric layer fluctuates due to the change in deposition condition for installing an etching stop layer or a low k dielectric in the application of damascene, which can be substituted for the former dielectric layer. Dual-damascene structure having a dielectric layer whose dielectric constant is not less than '2', which is lower than about 4, can execute deposition in the single reactor and is etched so that vertical or horizontal interconnects by making the concentration of carbon; oxygen gas such as carbon monoxide fluctuate. Etching gas for forming the vertical mutual interconnections comprises CO and a fluorocarbon, and CO gas is preferably removed from etching gas for forming the horizontal interconnects.



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(54)【発明の名称】 集積した低K誘電体層とエッチング停止層

(57)【要約】

誘電率が低くかつエッチング速度が水平相互接続部を形成するのに少なくとも3:1だけ変化する誘電体層を堆積しエッチングする方法。誘電体層中の炭素又は水素の量は、ダマシン適用におけるエッチング停止層又は従来の誘電体層に置換し得る低k誘電体層を設けるために、堆積条件の変化によって変動する。誘電率が約4よりも低い2以上の誘電体層をもつデュアルダマシン構造は、単一のリアクタ内で堆積を行なうことが可能で、次に、一酸化炭素のような炭素・酸素ガスの濃度を様々に変動させることによって垂直又は水平相互接続部を形成するようにエッチングされる。垂直相互接続部を形成するためのエッチングガスは、好ましくはCO及びフルオロカーボンを含み、水平相互接続部を形成するためのエッチングガスからは、好ましくはCOガスは除外される。

